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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,954	06/08/2005	Gunnar Hultquist	1026-0002WOUS	5447
49698	7590	11/02/2007		
MICHAUD-DUFFY GROUP LLP 306 INDUSTRIAL PARK ROAD SUITE 206 MIDDLETOWN, CT 06457			EXAMINER PALABRICA, RICARDO J	
			ART UNIT 3663	PAPER NUMBER
			MAIL DATE 11/02/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/537,954

Applicant(s)

HULTQUIST ET AL.

Examiner

Rick Palabrica

Art Unit

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 October 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 15-18 and 23-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-18 and 23-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 10/18/07, which directly amended claims 15 and 25, and canceled claims 19-22 and 26-29, has been entered.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 15-18 and 23-25 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for specific combinations internal fill gas pressure and carbon monoxide volume percent, does not reasonably provide enablement for combinations of internal pressure of fill gas of at least 3 bars and volume percent of carbon monoxide of at least 4% that are outside said specific

Art Unit: 3663

combinations. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make/use the invention commensurate in scope with these claims.

The specification (see page 14 and Table at page 15) discloses that there are specific conditions that have to be met regarding the selection of the internal pressure of fill gas and volume percent of carbon monoxide. Base on those conditions, certain combinations of fill gas and carbon monoxide volume are allowable. Note, for example, from the Table that a fill gas of 3 bars requires the carbon monoxide to have a 21.3% volume relative to the fill gas. As presently set forth in the claims (e.g., claim 1, which uses the claim language "at least"), a fill gas of 3 bars and a carbon monoxide volume percent of 4% will be an acceptable combination. This combination recited in claim 1 is inconsistent with the Table.

3. Claims 15-18 and 23-25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. There is no support for the combinations of fill gas pressure and carbon monoxide volume percent of that do not meet the specific conditions recited in the specification. See section 2 above.

Art Unit: 3663

4. Claims 15-18 and 23-25 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The condition that the ratio of the partial pressure of the carbon monoxide to the partial pressure of the fill gas being above a critical value, which is essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). See page 14, lines 20+ of the specification.

5. Claims 15-18 and 23-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 15 and 25 each recites the limitation, the internal pressure of the fill gas of at least 3 bar (abs) at "room temperature." The claims are vague, indefinite and incomplete and their metes and bounds cannot be determined because there is not one, unique room temperature at all places at all times. Thus, the internal pressure of the fill gas in the claims is defined in terms of an unknown value of room temperature.

The claims are vague, indefinite and incomplete because the claims are inconsistent with the specification with regard to the allowable combinations of fill gas pressure and carbon monoxide volume percent. See sections 2 and 3 above.

6. Claims 15-18 and 23-25 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted element is the condition

that the ratio of the partial pressure of the carbon monoxide to the partial pressure of the fill gas being above a critical value.

### ***Claim Objections***

#### **7. Duplicate Claims, Warning**

Both claims 15 and 16 recite a carbon monoxide volume of 4 percent of the fill gas. Applicant is advised that should claim 15 be found allowable, claim 16 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

### ***Response to Arguments***

8. Applicant traversed Ferrari '524 on the grounds that: a) "[t]he use of carbon monoxide is not specifically called out in Ferrari '524, but rather emphasis is placed on the use of carbon dioxide (in claim 2);"; b) in contrast to the claimed invention, the amount of added gas in Ferrari '524 "will decrease immediately after an initial use of the fuel rod." The examiner disagrees.

As to argument a), Ferrari '524 clearly states:

*"In accordance with the present invention, there is added to the helium atmosphere, a minor amount, preferably 2-3 percent by volume, of a gas selected from oxygen, carbon monoxide and carbon dioxide." See col. 2, lines 30+.*

Art Unit: 3663

Note in this regard, MPEP 2123 - Rejection Over Prior Art's Broad Disclosure Instead of Preferred Embodiments, which states:

PATENTS ARE RELEVANT AS PRIOR ART FOR ALL THEY CONTAIN

"The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain." *In re Heck*, 699 F.2d 1331, 1332-33, 216 USPQ 1038, 1039 (Fed. Cir. 1983) (quoting *In re Lemelson*, 397 F.2d 1006, 1009, 158 USPQ 275, 277 (CCPA 1968)).

A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments." Underlining provided.

Ferrari '524 teaches carbon monoxide as suitable for the exercise of the invention.

As to argument b), the above-cited feature upon which the applicant relies (amount of added gas not decreasing immediately) is not recited in rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Additionally, if said unrecited feature is considered by the applicant to be critical to his invention, then such omission would amount to a gap between the essential elements. In this case, the claim(s) would be incomplete and would be rejected under 35 U.S.C. 112, second paragraph. See MPEP § 2172.01.

9. Applicant traversed Ferrari '894 on the grounds that it: a) "fails to disclose, teach, or suggest the internal pressure of the initial fill gas as amounting to at least 3 bar, as recited in claim 15"; and b) "fails to disclose, teach, or suggest the proportion of carbon monoxide being at least 4 volume per cent of the initial fill gas." The examiner disagrees.

As to argument a), Ferrari '894 clearly states:

*"Briefly, the present invention consists in providing a 15 free-standing elongated fuel element for a nuclear re-actor comprising a tubular cladding enclosure, a body comprising preferably, a plurality of pellets of fissionable fuel material disposed within the tubular cladding enclosure, a plug disposed at each end of the tubular 20 cladding enclosure and hermetically sealed thereto, space-means within the sealed cladding enclosure to contain therein a gas at a pressure of the order of from 600 to 3000 p.s.i. at operating temperatures to offset the pressures of water in a reactor and at least 100 p.s.i. at 25 °C." Underlining provided. See col. 3, lines 15+*

A fill gas pressure between 600 and 3000 psi is clearly more than 3 bars.

As to argument b), Ferrari '894 was not applied to provide the teaching on the carbon monoxide volume but rather on the fill gas pressure (see above). Applicant's argument is misplaced because the applicant has not shown that the references do not teach what the examiner has stated they teach, nor, has the Applicant shown that the examiner's reasoning for and manner of combining the teachings of references is improper or invalid.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 15-18 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrari (U.S. 4,609,524) in view of Ferrari (U.S. 3,677,894) in combination with either Adamson et al. (U.S. 5,437,747) or King (U.S. 5,329,566). Ferrari ('524) discloses the applicant's claim limitations except for the gas pressures

Ferrari ('524) teaches a nuclear fuel rod for a boiling water reactor (see Fig. 1) comprising a zirconium alloy cladding 2 and a plurality of nuclear pellets 6.

Ferrari ('524) teaches introducing carbon monoxide and helium into the fuel rod as initial fill gases, as follows:

*"In accordance with the present invention, there is added to the helium atmosphere, a minor amount, preferably 2-3 percent by volume, of a gas selected from oxygen, carbon monoxide and carbon dioxide." See col. 2, lines 30+.*

Note that that the 2-3 percent volume of carbon monoxide to the helium gas is a preferred embodiment, i.e., this indicates that Ferrari ('524) admits that other embodiments involving different minor percentages of carbon monoxide can be used to exercise his invention.

Ferrari ('894) teaches that the fuel rods in boiling water and pressurized water reactors contain gas at a pressure in the order of 600-3000 psi, to withstand the pressures of the water coolant (see col. 3, lines 22+).

King teaches that carbon monoxide can have a deleterious effect on the cladding of a boiling water reactor (see col. 1, lines 47+).

Adamson et al. teach that the fuel cladding of a nuclear fuel rod is adversely affected by carbon monoxide at all temperature (see col. 1, lines 47+).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the fuel rod in Ferrari ('524), by the teaching of Ferrari ('894), to have an initial fill gas pressure of at least 3 bars, to gain the advantages thereof (i.e., prevent deformation of the fuel rod).because such modification is no more than the use of a well known expedient within the nuclear art.

It would have been intuitively obvious to one having ordinary skill in the art at the time of the claimed invention to properly consider the advantages of having carbon monoxide in the fill gas of a boiling water reactor fuel rod in the above Ferrari ('524)-Ferrari ('894), against the disadvantages of having carbon monoxide in the fill gas by the teaching in either King or Adamson et al. Therefore, the proportion of carbon monoxide in the initial fill gas, as recited in the above claims, is a matter of optimization within prior art conditions or through routine experimentation (see MPEP 2144.05 II.A). It would have been obvious to said artisan to have determined the proper carbon monoxide/inert gas proportion such that reducing the permeability of the cladding to tritium does not adversely affect the cladding of the fuel rod.

It would have been obvious to said artisan to pursue this known option of optimization using other small percentages of carbon monoxide that are near the preferred 2-3 percent volume in Ferrari ('524). Given that the claimed 4% volume of carbon monoxide is very close and, in fact, almost contiguous to the upper end of said well-known embodiment, it would have been intuitively obvious for an artisan to be motivated to try this value. If this leads to the anticipated success, it is likely the product NOT of innovation but of ordinary skill and common sense.

As to claim 23, applicant has not defined the degree of pre-oxidization of the inner surface of the cladding tube. Absent such definition, the examiner interprets the term broadly and reads it on the inherent pre-oxidation of the zirconium alloy tube of Ferrari ('524). This pre-oxidation occurs as a result of inherent exposure to the

Art Unit: 3663

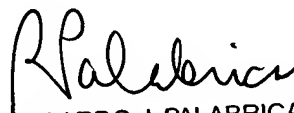
environment following the manufacture of a tube that is subsequently used to make the fuel rod in Ferrari ('524).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 571-272-6880. The examiner can normally be reached on 6:00-4:30, Mon-Thurs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RJP  
October 23, 2007

  
RICARDO J. PALABRICA  
PRIMARY EXAMINER